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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,367	10/07/2003	Kenichi Yokoyama	5988-056-27	4296

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EXAMINER

LEE, SIN J

ART UNIT PAPER NUMBER

1752

DATE MAILED: 07/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/679,367

Applicant(s)

YOKOYAMA ET AL.

Examiner

Sin J. Lee

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-16, 18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-12 is/are allowed.
- 6) ☒ Claim(s) 2-9, 13-16, 18 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicants canceled claims 1 and 17.
2. In view of the amendment of April 11, 2006, previous 102(b) rejection on claims 1, 2, 4-6, 15 and 17 over Nakano et al (JP'923) is hereby withdrawn. Due to newly cited prior arts, the following rejections are made non-final.

Claim Rejections - 35 USC § 102

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Nakano et al (JP 09-236923 and its Full English translation provided by PTO) (with Uenishi et al (5,089,373) which is being cited here to support the Examiner's assertion that Nakano's naphthoquinonediazido compound is a dissolution inhibitor and with Niki et al (5,658,706), which is being cited here to support the Examiner's assertion that Nakano's naphthoquinonediazido compound is an acid-generator).

Nakano teaches (see pg.2 of English translation, under "Solution mechanism" and see also Application Example 1 in [0027]) a positive photoresist composition containing an alkali-soluble novolak resin, a quinoneazido group-containing compound (such as naphthoquinone-1,2-diazido-5-sulfonic acid ester of 2,3,4,4'-tetrahydroxybenzophenone), and a compound of formula (I) such as 1-benzyl-2-ethylimidazole (which teaches present compound of formula (1) – present R¹, R³, R⁵ and R⁶ being H atoms, present R⁴ being an ethyl group (*which is an alkyl-substituted methyl group*), and present R² being an unsubstituted aryl group).

Nakano's naphthoquinonediazido compound is *a dissolution inhibitor*, as evidenced by Uenishi et al, col.1, lines 36-45, which lowers the solubility of the novolak resin in an alkali solution. But when it decomposes through irradiation, it forms alkali-soluble material and thus elevates the solubility of the novolak in alkali solution. Nakano's naphthoquinonediazido compound is also an acid-generating compound, as evidenced by Niki et al, col.6, lines 23-30. Therefore, Nakano teaches present components (A), (B) and (C-b) of claim 13 and thus teaches present invention of claim 13.

5. Claims 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Watabe et al (JP 1-197520 and its English abstracts: Chemical Abstract 112:66778 and JPO Abstract).

Full formal English translation has been submitted for the Japanese document. Only English abstracts are available at this time. Watabe teaches (see English abstracts) a composition containing an epoxy resin (an alkali-soluble resin), a cationic photopolymerization initiator (which is *a sulfonium salt* shown in Chem. Abstract) and a *curing agent (or hardener) for epoxy resin which is a diaminotriazine-modified imidazole compound* (for the chemical structure for those compounds, see Chem. Abstract). Thus, Watabe's diaminotriazine-modified imidazole compounds shown in Chem. Abstract teach present compound of formula (1) as well as present component (E). Therefore, Watabe teaches present inventions of claims 7-9.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 3-5, 7-9, 14-16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasunami et al (US 2003/0054287 A1).

In Example 1 (see [0260]-[0264] and Table 1), Yasunami teaches a resist composition containing an acid-generator (1-1) (a sulfonium salt shown in [0093]), Polymer (B-21) (which is shown in [0056]), a nitrogen-containing basic compound (E), and a surfactant. As one of *particularly preferable* compounds to be used as the component (E), Yasunami includes N-methylimidazole (which is equal to 1-methylimidazole) (see [0114] and [0110]). Therefore, it would have been obvious to one skilled in the art to use N-methylimidazole (which teaches present compound of formula (1) in claims 16 and 18 with present R^1 - R^6 being H atoms) as Yasunami's component (E) with a reasonable expectation of obtaining a resist composition which is excellent in sensitivity, resolution, pattern profile and edge roughness. Therefore, Yasunami renders obvious present inventions of claims 16, 5, 18, 3 and 14. With respect to present claims 4 and 15, Yasunami also teaches the equivalence of Polymer (B-21) and Polymer (B-6) which is shown in [0056]. Since the prior art teaches the equivalence of those two polymers, it would have been obvious to one skilled in the art to use Polymer (B-6) as Yasunami's polymer with a reasonable expectation of obtaining a resist composition which is excellent in sensitivity, resolution, pattern profile and edge roughness. Therefore, Yasunami's teaching renders obvious present inventions of claims 4 and 15.

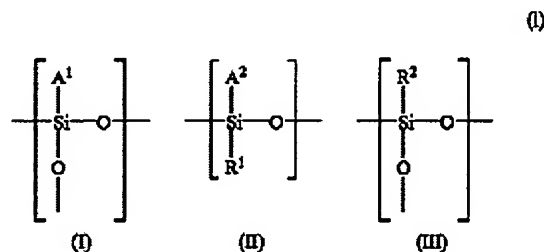
In Example 101, Yasunami teaches a negative resist composition containing Polymer (1) (polyhydroxystyrene shown in [0166]), a crosslinking agent, an acid generator (PAG4-7) (a sulfonium salt shown in [0097]) and a nitrogen-containing component (E). Yasunami also teaches that the same kind of nitrogen-containing compound that was used for positive resist composition can be used in his negative resist composition (see [0241]). As discussed above, as one of particularly preferable compounds to be used as the component (E), Yasunami includes N-methylimidazole. Therefore, it would have been obvious to one skilled in the art to use N-methylimidazole (which teaches present compound of formula (1) in claim 7 with present R^1 - R^6 being H atoms) as Yasunami's component (E) with a reasonable expectation of obtaining a resist composition which is excellent in sensitivity, resolution, pattern profile and edge roughness. Therefore, Yasunami's teaching renders obvious present inventions of claims 7-9.

8. Claims 16 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasawa et al (US 2001/0041769 A1) in view of Yasunami et al (US 2003/0054287 A1).

In claim 1, Iwasawa teaches the following:

2. A radiation-sensitive resin composition comprising:

- (a) a resin which comprises a polysiloxane insoluble or scarcely soluble in alkali and having the following structural unit (I) and/or the following structural unit (II), and the following structural unit (III),



wherein A¹ and A² individually represent a monovalent organic group having an acid-dissociable group which dissociates by an action of an acid, R¹ represents a hydrogen atom, a monovalent hydrocarbon group having 1-20 carbon atoms, a monovalent halogenated hydrocarbon group having 1-20 carbon atoms, a halogen atom, or a primary, secondary, or tertiary amino group, and R² represents a monovalent hydrocarbon group having 1-20 carbon atoms, a monovalent halogenated hydrocarbon group having 1-20 carbon atoms, a halogen atom, or a primary, secondary, or tertiary amino group; the polysiloxane having a polystyrene-reduced weight average molecular weight determined by gel permeation chromatography (GPC) in the range of 500-1,000,000 and becoming soluble in alkali when an acid-dissociable group dissociates, and

- (b) a photoacid generator.

Iwasawa also teaches the use of a nitrogen-containing organic compound as acid diffusion controller ([0307]-[0314]). As suitable examples for such diffusion controller, Iwasawa discloses imidazole compounds such as 4-methylimidazole, and such compound is known in the art to be equivalent to N-methylimidazole, as evidenced by Yasunami, [0114]. Because those two compounds were art-recognized equivalents at

the time the invention was made, it would have been obvious to one skilled in the art to use N-methylimidazole as Iwasawa's nitrogen-containing organic compound with a reasonable expectation of improving storage stability or the resulting composition and resolution as a resist. Therefore, Iwasawa in view of Yasunami would render obvious present inventions of claims 16 and 6.

9. Claims 19 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adegawa et al (US 2003/0039916 A1).

In Example 1 (see Table 1), Adegawa teaches a positive resist composition containing an acid generating compound III-1 (an iodonium salt shown in [0144]), a binder PHS-2 (polyhydroxystyrene – see [0390]), a dissolution inhibiting compound and a basic compound. In [0294], Adegawa teaches N-methylimidazole as one of *particularly preferred* examples of his organic basic compound. Therefore, it would have been obvious to one skilled in the art to use N-methylimidazole (which teaches present compound of formula (1) in claim 19 with present R¹-R⁶ being H atoms) as Adegawa's basic compound with a reasonable expectation of obtaining a resist composition which has high sensitivity and resolution and provides an excellent rectangular pattern profile. Therefore, Adegawa's teaching renders obvious present inventions of claims 19 and 2.

Allowable Subject Matter

10. Claims 10-12 are allowed. None of the cited prior arts teaches or suggests present compound of claim 10 or present compound of formula (1) claim 12.

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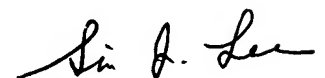
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee
June 26, 2006



SIN LEE
PRIMARY EXAMINER